IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

ATTY.'S DOCKET: MAHLAB=2

In re Application of:	)	Art Unit: 2613
Uri MAHLAB	)	Examiner: A. Bello
Appln. No.: 09/936,440	)	Washington, D.C.
Filed: January 25, 2000	)	Confirmation No. 3860
For: METHOD AND APPARATUS FOR ROUTING DATA-CARRYING OPTICAL SIGNALS	)	**June 30, 2008**

DECLARATION OF URI MAHLAB

I, Dr. Uri Mahlab, declare as follows:

(1) I am employed by ECI since August 1998, as a leader of the optical research activity and hold a position as a senior lecturer at the Holon Institute of Technology, Israel, since 1994.

(2) I received a BSc degree in Electrical Engineering (EE) form the Ben Gurion University of the Negev, Beer-Sheva Israel, and MSc and PhD degrees in Electrical Engineering from the Technion-Israel Institute of Technology, Haifa, Israel, in 1989 and 1992, respectively. I am a senior lecturer in the Holon Academic Institute of Technology (HIT) in Holon, Israel, in the Electrical Engineering department, and have been a member in HIT since 1994.

(3) I have been involved in the industry since 1992; I was employed by ELOP (Electro-Optical Industry in Israel), Tadiran Co. in the field of military communication, and since 1998 I have been with ECI TELECOM in the field of optical technologies and

networking of the Networks Solution Division. I am a member of OSA and a senior member of the IEEE.

(4) I am the inventor (or co-inventor) of 26 inventions, each filed as a patent application in a number of countries. A list of publications and papers in which I am either the author or a co-author is presented in Appendix A to this declaration.

(5) I have reviewed the above-identified application, including the specification, drawings, and pending claims, and also the prosecution of the application, including the office actions, the cited art, and the responses that have been filed to-date.

(6) In my opinion, one of ordinary skill in the art is a person having a bachelor of science degree in electrical engineering, with 2-3 years experience in the telecommunications field

(7) I understand that claims 45-47, 53, 55, 57, 66, 72, 82-83, and 86 were rejected under 35 U.S.C. § 102(b) as being anticipated by Barnsley (U.S. Patent No. 5,488,501).

(8) I understand that this means that the Examiner has taken the position that Barnsley discloses each and every element in the listed claims arranged as in the claim.

(9) All of the independent claims recite, among other things, and in different ways, that there are different optical fibers for carrying optical data signals separate from their associated optical addressing signals and optical fibers for carrying the optical addressing signals separate from their associated optical data signals, and that the various claimed network elements and/or routers have routing capabilities.

(10) The Examiner asserts that Barnsley discloses "a first communication path (citing the optical path between splitter 7 and switch 8) extending between at least two

network elements (citing splitter 7 and switch 8) and comprising at least one optical link (*e.g.*, the optical link between the output of splitter 7 and the input of optical switch 8) for carrying optical data signals.

(11) In Barnsley, the splitter 7 takes a small proportion of the combined incoming signal, which comprises data signal 4a and the associated control signal 5a of an incoming packet (coming in on path 2), and feeds it to the filter 14 through the amplifier 15. Col. 4, lines 18-21.

(12) However, the rest of the combined incoming signal (*i.e.*, the data signal and the control signal) travels along the fiber 2 between the splitter 7 and the switch 8.

(13) Thus, in Barnsley, the path between 7 and 8 does not carry optical data signals separated from their associated optical addressing signals.

(14) Further, the points 4, 5, 6, 7, 14 and 15 of Barnsley are not network elements as they would be understood by one of ordinary skill based on Applicant's disclosure.

(15) As discussed in the summary of the application specification,

> the network element in accordance with the present invention is a device provided with routing capabilities, e.g. a router, and the like. For the sake of convenience such a network element will be referred to hereinafter as a 'router', but this term should be understood to encompass also any other device having switching and forwarding capabilities.

(16) In my opinion, one of ordinary skill in the art would understand, based on the knowledge of the relevant technology, and from reading the specification, that a router, or a network element having routing capabilities, means a device having switching and forwarding capabilities.

(17) Points 4, 5, 6, 7, 14, and 15 and the light source and modulator in Barnsley, do not having routing, *i.e.,* switching and forwarding, capabilities.

(18) Point 4 is an optical data generator and point 5 is a header generator.

(19) Barnsley states:

> The optical data generator 4 produces data packets . . . by modulating a laser. . . . The header generator 5 produces header (control) signals . . . by modulating a second laser . . .

(20) There is no disclosure in Barnsley that generators 4 and 5 have routing, *i.e.,* switching and forwarding, capabilities. Furthermore, as known in the art, such devices do not possess switching and forwarding capabilities.

(21) Point 6 is a WDM coupler. Newton's Telecom Dictionary, 20th edition (2004) (copy attached as Exhibit 1) defines "coupler" as "an optical device that combines or splits power from optical fibers." One of ordinary skill in the art would understand that couplers do not have routing, *i.e.,* switching and forwarding, capabilities.

(22) In Barnsley, point 7 is a splitter, 14 is a band-pass filter, and 15 is an optical amplifier. Barnsley states that "splitter 7 demultiplexes a small proportion (typically a few percent) of the control signal 5a of an incoming packet and feeds this tapped signal to a band-pass filter 14 via a 1.3 μm optical amplifier 15." Col. 4, lines 18-21. One of ordinary skill in the art would thus understand that splitter 7, filter 14, and amplifier 15 do not have routing, *i.e.,* switching and forwarding, capabilities.

(23) The Examiner also asserts that the light source and modulator correspond to the claimed network elements. One of ordinary skill in the art would understand that

light sources and modulators do not have routing, *i.e.,* switching and forwarding, capabilities. Thus, they do not meet the claimed limitations.

(24) The node 1 described in Barnsley arguably has routing capabilities. However, Barnsley does not disclose two different communication paths between two nodes 1 or between the switch 8 and a node 1.

(25) It is my understanding that the Examiner's position is that the claimed "first communication path" extends between optical data generator 4 and coupler 6, and the "second communication path" extends between control filter 14 and switch 8.

(26) I also understand that, according to the Examiner, the line between data generator 4 (allegedly a network element) and between coupler 6 carries only data signals, so that meets the claimed "a first communication path . . . comprising at least one optical link (line 4-6) for carrying optical data signals separated from optical addressing signals".

(27) Further, it is my understanding that the Examiner's opinion is that the line between control filter 14 and switch 8 carries only addressing signals, so that meets the limitations in that claims of "a second communication path . . . comprising one or more optical links for carrying optical addressing signals separated from said optical data signals."

(28) I disagree with the Examiner's positions.

(29) Claim 45 would be understood by one of ordinary skill in the art to recite that the first communication path comprises at least one optical fiber extending between at least two network elements of the telecommunication system for carrying optical data signals separated from their associated optical addressing signals, and a second

communication path comprising one or more optical fibers extending between at least two network elements of the telecommunication system for carrying optical addressing signals separated from their associated optical data signals, wherein each of the network elements have routing capabilities. Further, according to the claimed method, at least one of the at least one optical fiber comprised in the first communication path for carrying the optical data signals separated from their associated optical addressing signals is different from any of the one or more optical fibers comprised in the second communication path. Finally, the optical data signals conveyed separately from the optical addressing signals along the at least one optical fiber were generated at a plurality of different network elements, each of the plurality of different network elements having routing capabilities.

(30) One of ordinary skill in the art would understand that there is no suggestion in Barnsley how to carry optical data signals separated from their associated addressing signals between such at least two network elements of the telecommunication system, where each of the at least two network elements have routing, *i.e.,* switching and forwarding, capabilities.

(31) Thus, Barnsley does not teach Applicant's claimed invention arranged as recited in claim 45.

(32) Furthermore, according to Barnsley, the system disclosed includes "means for multiplexing the data and control signals onto the transmission line in such a manner that the duration of the control signal is at least equal to the duration of the data signal … to ensure that the control signal completely overlaps the data signal on arrival

at the second node " (col. 1, lines 59-66) and also "As the control signal overlaps the data signal, the two signals occupy the same time slot" (col. 2, lines 3-4).

(33) Thus, one of ordinary skill in the art would understand from the disclosure of Barnsley that the both data and control signals must arrive together to the next node.

(34) Moreover, one of ordinary skill in the art would understand that the operation of the whole Barnsley system relies and is based upon the fact that both data and control signals arrive together. "The header generator 5 produces header (control) signals... by modulating a second laser ... so that the laser of the header generator 5 is turned on at, or just before, the start of the data packet... the header generator 5 is tunable so as to provide control signals at different wavelengths, each of which matches the receive wavelength of another network node" (col. 3, line 60 - col. 4, line 5).

(35) In other words, for the Barnsley system to route a packet, the packet must contain the addressing signal. Therefore, one of ordinary skill in the art would understand that Barnsley teaches away from the present invention. Because unlike Barnsley, which needs to have both the addressing signals and the data arriving at the network element together in order to ensure that the network element has the control signal required to send the data to the next network element, the present invention is designed so that the control signals and the data travel at least part of their respective paths, separately.

(36) There is no explicit indication, nor any implicit suggestion provided by Barnsley, to transmit the data and control signals along different paths between two nodes or routers in the system, because Barnsley does not do so, and in fact, teaches away from doing so.

I declare under penalty of perjury that the foregoing is true and correct.

Respectfully submitted,

Dated: April 20th 2009

Uri Mahlab

Dr. Uri Mahlab

APPENDIX A

List of Publications

1. J. Grosman, D. Wullich, U. Mahlab
"Large Signal Analysis of a Sampled PLL"
Electronic Letters, 22(3), 1986 (156-158)

2. M. Fleisher, U. Mahlab, J. Shamir
"Entropy Optimized Filter for Pattern Recognition"
Applied Optics, 29(14), 1990 (2091-2098)

3. U. Mahlab, J. Shamir
"Phase Only Entropy Filter Generated by Simulated Annealing"
Optics Letters, 14(21), 1989 (1168-1170)

4. U. Mahlab, M. Fleisher, J. Shamir
"Error Probability in Optical Pattern Recognition"
Optics Communication, 77(56), 1990 (415-422)

5. U. Mahlab, J. Rosen, J. Shamir
"Iterative Generation of Holograms on Spatial Light Modulator"
Optics Letters, 15(10), 1990 (556-558)

6. U. Mahlab, M. Fleisher, J. Shamir
"On the Number of Allowable Classes in Optical Multi-channel Pattern Recognition"
Optics Communication, 78, 1990 (332-336)

7. J. Rosen, U. Mahlab, J. Shamir
"Adaptive Learning with Joint Transform Correlator"
Optical Engineering, 29, 1990 (1101-1106)

8. U. Mahlab, J. Rosen, J. Shamir
"Iterative Generation of Complex Reference Function in Joint Transform Correlator"
Optics Letters, 16, 1991 (330-332)

9. J. Rosen, U. Mahlab, J. Shamir
"Complex Reference Discriminant Functions Implemented on a Joint Transform Correlator" Applied Optics, 30, 1991 (5111-5115)

10. U. Mahlab, J. Shamir
"Optical Pattern Recognition Based on Convex Function"
J. Optical Society of America A., 8(8), 1991 (1233-1239)

11. U. Mahlab, J. Shamir, H.J. Caulfield
"Genetic Algorithm for Optical Pattern Recognition"
Optics letters, 16(9), 1991 (648-650)

12. M. Fleisher, U. Mahlab, J. Shamir
"Target Location Measurement by Optical Correlators - A Performance Criterion"
Applied Optics, 31(2), 1992 (230-235)

13. U. Mahlab, J. Shamir
"Comparison of Iterative Optimization Algorithms for Filter Generation in Optical Correlators"
Applied Optics, 31(8), 1992 (1117-1125)

14. J. Shamir, J. Rosen, U. Mahlab, H.J. Caulfield
"Optimization Methods for Pattern Recognition"
SPIE, CR-40, 1992 (2-24)

15. M. Friedman, U. Mahlab, J. Shamir
"Collective Genetic Algorithm for Optimization and its Electro-optic Implementation"
Applied Optics, 32(23), 1993 (4423-4429)

16. M. Bank, M. Bank, U. Mahlab, J. Gavan
"Realization of an Efficient New Raised Cosine Filter for Digital Broadcasting Receivers"
IEEE Transactions on Broadcasting, 15(4), 1998 (89-93)

17. D. Sadot, U. Mahlab, V. Bar Natan
"New Method for Developing Optical Coded Division Multiplexed Access Sequences using Genetic Algorithm"
Optical Engineering, 38(1), 1999 (151-156)

18. J. Gavan, M. Haredim, U. Mahlab
"Multimode Ladar/Radar Active Transponder Systems for Tracking Very Long Operation Ranges Cooperative Targets"
Int'l. J. of Infrared and Millimetric Waves, 21, 2000 (1181-1189)

19. H. Matzner, N. Amir, U. Mahlab, J. Gavan
"Enhancement of Numerical Computation Methods Useful for Radio Communication Antenna Systems"
Int'l. J. of Applied Computational Electromagnetics Society
15(3), 2000 (175-185)

20. J. Gavan, U. Mahlab

"Nanocells Intrasystem Interference Realistic Worst Case Analysis for Open Site Personal Communication Scenarios"
Int'l. J. of Applied Computational Electromagnetics Society, 15(3), 2000 (135-143)

21. M. Gutin, U. Mahlab, BA. Malomed
"Shaping NRZ Pulses and Suppression of the Inter-Symbol Interference by a Second-Harmonic-Generating Module"
Optics Communications, 200, 2001 (401-414)

22. M. Zaacks, A. Zeitouny, M. Horowitz, U. Mahlab
"Measurement Technique of Phase Aberration Induced by Fiber Bragg Gratings"
IEEE Photonics Technology Letters, 14(3), 2002 (352-354)

23. M. Zaacks, U. Mahlab, M. Horowitz, S. Stepanov
"Online Measuring Dispersion Sign in Optical Communication Systems"
Electronics Letters, 39(16), 2003 (1198-1199)

24. R. Driben, B.A. Malomed, M. Gutin, U. Mahlab
"Implementation of Non-linearity Management for Gaussian Pulses in a Fiber-optic Link by Means of Second-Harmonic-Generating Modules"
Optics Communications, 218, 2003 (93-104)

25. R. Driben, B.A. Malomed, U. Mahlab
"Integration of Nonlinearity-Management and Dispersion-Management for Pulses in Fiber-optic Links"
Optics communications, 232, 2004 (129-138)

26. I. Landesman, U. Mahlab, S. Ruschin
"Chirp Compensating in Long Haul Optical Links by means of Self-phase Modulation and Real-time Feedback"
Optical Engineering, 43(12), 2004 (3061-3067)

27. O. Aharon, B.A. Malomed, Y. Band, U. Mahlab
"Minimization of the Pulse's Timing Jitter in a Dispersion-compensated WDM System"
Optical and Quantum Electronics, 36, 2004 (349-366)

28. M. Bank, U. Mahlab
"Hearing System Model and Sound Quality Estimation"
WSEAS Transactions on Acoustics and Music, 1(1), 2004 (34-44)

29. Y. Ben-Ezra, U. Mahlab, B.I. Lembrikov, E. Dolev
"Automatic Detection and Classification of Power Transients in Optical Communication Networks"
J. of Optical Networking, 5(7), 2006 (568-574)

30. M. Gubergrits, R.E. Goot, U. Mahlab, S. Arnon
"Adaptive Power Control for Satellite to Ground Laser Communication"
Int'l. J. of Satellite Communications and Networking, 25, 2007 (349-362)

31. G. Katz, U. Mahlab, A. Levy
"Channel Estimators for Maximum-Likelihood Sequence Estimation in Direct-Detection Optical Communications"
Optical Engineering, 47(4), 2008 (045003-1–045003-4)

E. PAPERS PRESENTED AT SCIENTIFIC MEETINGS PUBLISHED IN PROCEEDINGS

1. U. Mahlab, J. Rosen, J. Shamir
"Correlator with a Complex Reference Generated Iteratively"
Optical Society of America 1990 Annual Meeting, Oct.1990
Boston, Massachusetts, USA

2. J. Gavan, U. Mahlab
"Analysis and Computation of Single-Tone Spurious Effects in Non Saturated Super Heterodyne Receivers Systems"
Int'l Wroclaw Symp. on Electromagnetic Compatibility
Poland, July 1996

3. J. Gavan, U. Mahlab
"Analysis and Computation of Single-Tone Spurious Effects in Non Saturated Super Heterodyne Receivers Systems"
U.R.S.I. - Union Radio Scientific International
Lille, France, 28 Aug.-5 Sept. 1996, (645-646)

4. R.E. Goot, U. Mahlab
"Group Operation of Radio Communication Systems"
IEEE - the 19th Conv. of Electrical and Electronics Engineering in Israel
Jerusalem, Israel, 5-6 Nov. 1996 (37-40)

5. U. Mahlab, J. Gavan
"Optimization of Microwave Receivers for Suppression of Single Tone Spurious Interference"
Proc. 27th European Microwave Conf. Jerusalem, Israel, Sept. 1997 (1207-1215)

6. D. Sadot, U. Mahlab, V. Bar Natan
"A New Method for Developing Optical CDMA Address Code Sequence using the Genetic Algorithm"

IEEE Int'l. Conf. on Communication (ICC'98)
Atlanta, USA, 3(3), June 1998, (1279-1283)

7. M. Zaacks, U. Mahlab, M. Horowitz
"Low Cost Dispersion Sign Monitor for 40Gb/s Systems"
Optical Fiber Communication Conf./National Fiber Optic Engineers Conf. (OFC/NFOEC 2005)
Anaheim, CA, USA, 6-11 March 2005

8. M. Zaacks, U Mahlab, W. Weiershausen
"Survivable and Reconfigurable Metropolitan DWDM Network with up to 40 Gb/s Line Rates"
Optical Fiber Communication Conf./National Fiber Optic Engineers Conf. (OFC/NFOEC 2005)
Anaheim, CA, USA, 6-11 March 2005

9. U. Mahlab, E. Dolev
"Optical Transmission Links Design Technique"
8th Int'l. Conf. on Transparent Optical Networks (ICTON 2006)
Nottingham, UK, 18-22 June 2006 [invited]

10. Y. Ben-Ezra, U. Mahlab, B.I. Lembrikov, E. Dolev
"Application of Wavelet Networks for Identification of Transients in Optical Networks"
8th Int'l. Conf. on Transparent Optical Networks (ICTON 2006)
Nottingham, UK, 18-22 June 2006 [invited]

11. D. Sadot, G. Katz, U. Mahlab
"Advanced Trends in Electrical Dispersion Compensation in
Optical Communications OOK Systems"
8th Int'l. Conf. on Transparent Optical Networks (ICTON 2006)
Nottingham, UK, 18-22 June 2006 [invited]

12. M. Zaacks, U. Mahlab, P. Mamyshev, C. Rasmussen, J. Calvitti, K. Falta
"Demonstration of 1000km 43GB/s RZ-DPSK Transmission through a 50GHz Channel Spaced WSS"
Optical Fiber Communication Conf./National Fiber Optic Engineers Conf. (OFC/NFOEC 2007)
Anaheim, CA, USA, 25-29 March 2007

13. O. Rozen, T. Cohen, G. Kats, D. Sadot, A. Levi, U. Mahlab
"Dispersion Compensation in Non-linear Self Phase Modulation (SPM) and Cross Phase Modulation" (XPM) Induced Optical Channel using Vectorial MLSE Equalizer
9th Int'l. Conf. on Transparent Optical Networks (ICTON 2007)
Rome, Italy, 1-5 July 2007 (302-304) [invited]

14. Y. Ben-Ezra, U. Mahlab, B.I. Lembrikov, V. Vulfin
"Analysis and Identification of Fast Transients in Optical Networks"
9th Int'l. Conf. on Transparent Optical Networks (ICTON 2007)
Rome, Italy, 1-5 July 2007 (309-312) [invited]

15. Y. Ben-Ezra, U. Mablab, M. Haridim, B.I. Lembrikov
"Applications of All-Optical Signal Processing in Modern Optical Communications"
9th Int'l. Conf. on Transparent Optical Networks (ICTON 2007)
Rome, Italy, 1-5 July 2007 (328-331) [invited]

16. D. Dahan, A. Levy, D. Jacobian, E.Yohi, U. Mahlab
"ASE Noise Instability Migration in WSS ROADM Based Closed Amplified Ring Networks"
Optical Fiber Communication Conf./National Fiber Optic Engineers Conf. (OFC/NFOEC 2008)
San Diego, CA, USA, 24-28 Feb 2008

17. O. Rozen, d. Sadot, G. Katz, a. Levy, U. Mahlab
"Dispersion Compensation of Self Phase Modulation Impairment in Optical Channel using MLSE"
10th Anniversary Int'l. Conf. on Transparent Optical Networks (ICTON 2008)
Athens Greece, 22-26 June 2008 (178-181)

18. Y. Ben-Ezra, M. Ran, U. Mahlab, B.I. Lembrikov, M. Haridim
"High Spectral Efficiency Optical Transmission of OFDM Ultra-Wideband Signals beyond 40 Gb/s"
10th Anniversary Int'l. Conf. on Transparent Optical Networks (ICTON 2008)
Athens Greece, 22-26 June 2008 (186-189)